Preface

In the digital era, various media have received great attention in retrieving, displaying, manipulating, and communicating information. We may look at such digital media from two distinct perspectives, scientific and artistic. Due to the great importance of digital media, different university-level programs have been created to serve such areas of emerging science and arts. Some of these programs study the engineering and scientific aspects of digital media, e.g., video processing, audio processing, computer-generated imagery, etc. Other programs are concerned with the artistic creations built upon the advances in this area, e.g., digital photography, video production, audio production, etc.

Visual computing represents a section of the engineering and scientific aspects of digital media, where digital images become the core around which different fields of computer research are established. Such fields include computer vision, image processing, computer graphics, and visualization. Although digital imaging can be considered the greatest common divisor among those fields, essential differences are present among them. For instance, while computer graphics is the field concerned with representing descriptive data through artificial digital imaging form, computer vision is the field concerned with extracting descriptive data from real-world digital images. Another closely related and important research field is image processing that is concerned with manipulation of digital images. Algorithms developed in this field may be used as preprocessing steps to enhance the outcome of a vision system. All the fields are connected to some extent.

This book is concerned with the graphics part of visual computing. It handles the subject through explaining algorithms and concepts and providing plenty of solved problems. Our aim is that students understand and practice numeric problems. The target readers of this book are upper-division undergraduate students and other graduate students who did not take a computer graphics course before. The reader is expected to have a basic knowledge of mathematics and linear algebra (An appendix is provided at the end of the book). Since we talk about concepts and solving problems, no programming experience is needed to read the book.

Cairo, Egypt, December 2013

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Digital Media
A Problem-solving Approach for Computer Graphics
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2014, XXXVI, 686 p. 314 illus., Softcover
ISBN: 978-3-319-05136-9